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EFFECTS OF ACEPROMAZINE AND MIDAZOLAM ALONG WITH KETAMIN ON HAEMATOLOGICAL PARAMETERS IN YAK

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ABSTRACT

The study was conducted to study the effect of acepromazine and midazolam along with ketamin on haematological parameters in yak. Twelve clinically healthy yaks of either sex and below 2 years of age from yak farm of ICAR- National Research Centre on Yak, Dirang, Arunachal Pradesh were selected for the study. Yak were randomly divided into two groups, Group AK and Group MK i.e. six animals in each group. The animals in Group AK received acepromazine @0.1mg/kg body weight IM followed by ketamine @2.5mg/kg body weight IM after 15 minutes and the animals in Group MK received midazolam @0.5mg/kg body weight IM followed by ketamine @2.5mg/kg body weight IM after 15 minutes. Venous blood samples were collected at 0 (baseline) and at 15, 30, 60 and 90 minutes after administration of anaesthetic agents to monitor the haematological parameters which included haemoglobin, packed cell volume, total erythrocyte count and total leukocyte count. The changes in haematological parameters in both the group were within the normal physiological limit. Based on the findings, both the anaesthetic combinations were found safe to be used in yak.

KEY WORDS: Acepromazine, Haematological Parameters, Midazolam, Ketamin & Yak

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Original Article

INTRODUCTION

Yak (*Poephagus grunniens*) is a remarkable bovine species of economic importance inhabiting at high altitude snow bound Himalayan region of India. Unlike other bovine species, the yak has been considered as multipurpose animal as it provides milk, meat, fiber, hide and dung as well as the most needed source of transportation of goods. In India, yak is mostly reared in Jammu & Kashmir, Himachal Pradesh, Sikkim, west Bengal, Uttarakhand and Arunachal Pradesh. In Arunachal Pradesh, though the population of yak is very less in comparison to total livestock population but, still it commands importance in life of the nomadic people in the mountainous regions of Tawang and West Kameng districts.

Many diseases are encountered requiring treatment or surgical intervention in yak. Keeping in view of the economic losses to farmers, it is essential to restore the structural and functional continuity of the animal (Kumar *et al.*, 2004). Hence, anaesthetising a large ruminant is a challenge and a wide scope of research exists with a quest to searchfor more safe and effective general anaesthetic techniques for ruminants (Malik *et al.,* 2011). So,keeping in view of these, the present study was done to investigate the safety of using the combination of acepromazine, midazolam, and ketamine and to study its effect on haemological parameters on yak.

Acepromazine (2-acetyl-10-(3-dimethylaminopropyl) phenothiazine) is a tranquilizer and anaestheticpremedicant used in veterinary anaesthesia while Midazolam(8-chloro-6(2-flurophenol)-1-methyl-4H imidazo (1,5-a) (1,4)) is a medication used for anesthesia, procedural sedation, trouble sleeping, and severe agitation. Moreover Ketamin is usually used for starting and maintaining anesthesia.

MATERIALS AND METHODS

The study was conducted at yak farm of ICAR-National Research Centre on Yak situated at Nyukmadung,Dirang, Arunachal Pradesh at an altitude of 2800 m above msl during February-March,2016. The ambient temperature during study ranged between -2 ^{0}C to 15^{0}Cwith average of 8-11 ^{0}Cduring the day time. Twelve clinically healthy yaks of either sex and below 2 years of age were selected and randomly divided into two groups, Group AK and group MK with six animals each. The yaks were randomly divided into two groups viz. Group AK and Group MK comprising six yaks in each group. Group AK was treated with acepromazine @0.1mg per kg body weight IM followed by ketamine @2.5mg per kg bodyweight after 15 minutes and Group MK was treated with midazolam @0.5mg per kg body weight IM followed by ketamine @2.5mg per kg bodyweight after 15 minutes. Blood samples were collected from the jugular vein in sterilised vials prior to injection of preanaesthetic at 0 minute (baseline) and at 15, 30, 60 and 90 minutes after administration of the anaesthetic agent. The haematological parameters were estimated as per the standard methods. The estimation of haemoglobin was done by Sahli's Acid Haematin method and was expressed in gm percentage. The PCV was estimated by microhaematocrit method and expressed in percentage. The TEC was estimated under a haemo cytometer and was expressed in million/mm^3. The TLC was estimated under a hemo cytometer and was expressed in thousand/mm^3. The data was analysed by using t-test between the groups.

RESULTS AND DISCUSSIONS

The value of mean Hb (g/dl), PCV, TEC and TLC in group AK and MK at 0, 15, 30, 60 and 90 minutes interval are given in table 1.

Haemoglobin (Hb)

The mean Hb (g/dl) at 0, 15, 30, 60 and 90 minutes intervals were 11.73±0.55, 10.68±0.31, 10.52±0.51, 11.22±0.47, 11.34±0.52 and 11.12±0.37, 10.93±0.45, 11.10±0.51, 11.29±0.69, 11.16±0.75in Group AK and MK respectively. In Group AK, the Hb level decreased non-significantly till 30 minutes and increased thereafter. In Group MK, the value decreased non-significantly at 15 minute and returned gradually towards the baseline value. However, the changes were statistically not significant and within the physiological limit. There was a non-significant decrease in haemoglobin level in both the groups. The decrease in haemoglobin level in both the groups might be due to the pooling of circulatory blood cells in the spleen and other reservoirs secondary to decreased sympathetic activity and shifting of fluid from extra vascular compartment to intravascular compartment in order to maintain normal cardiac output in animals (Wagner, 1991).

Packed Cell Volume (PCV)

The mean PCV (%)at 0, 15, 30, 60 and 90 minutes were 34.33±2.83, 33.16±3.15, 29.83±1.75, 32.16±3.63, 33.83±4.05 and 32.75±2.58, 30.00±1.20, 31.08±1.52, 31.25±1.28 and 32.41±0.85 in Group AK and Group MK respectively. The packed cell volume sight a decrease initially in both the groups. However, it was not significant. The

decrease in PCV in both groups might be due to splenic pooling of blood and inter compartmental fluid shift during anaesthesia. Alpha adrenergic blocking effect of acepromazine which might induce relaxation to the spleen and consequently caused splenic sequestration of erythrocytes (Jain, 1993). Similar observations were also reported during medetomidine-midazolam-ketamine anaesthesia in calves by Kilic (2008) and with midazolam-ketamine anaesthesia in buffaloes by Malik*et al.* (2011).

Total Erythrocyte Count (TEC)

The mean TEC (Million/mm^3) in Group AK at 0, 15, 30, 60 and 90 minutes were 5.28±0.36, 4.92±0.20, 4.83±0.35, 5.18±0.25 and 5.51±0.46 and in Group MK the values were 5.05±0.41, 4.88±0.38, 4.98±0.38, 5.38±0.36 and 5.16±0.40 respectively. In Group AK, the TEC tend to decrease non-significantly up to 30 minutes and showed a gradual rise thereafter. In Group MK, the values decreased non-significantly at 15 minute and increased gradually towards the end of study period. However, the changes were statistically not significant and within the physiological limit. The changes in the TEC values could be attributed to the spleenic pooling of blood and shifting of fluid from extra vascular compartment to intravascular compartment to maintain normal cardiac output (Lang *et al.*, 1979). Kilic (loc cit) also found similar observation during medetomidine-midazolam-ketamine anaesthesia in calves.

Total Leukocyte Count (TLC)

The mean TLC(Thousand/mm^3) in Group AK at 0, 15, 30, 60 and 90 minutes were 4.51±0.32, 4.10±0.16, 4.28±0.16, 4.33±0.11 and 4.48±0.30 and in Group MK the values were 4.41±0.69, 4.30±0.58, 4.43±0.49, 4.52±0.45 and 4.45±0.56 respectively. In both the groups, no significant change was observed in TLC. Montane *et al*., (2003) also observed similar observation while studying the effects of acepromazine. Kelawala *et al*., (1991) observed similar findings with ketamine anaesthesia in diazepam premedicated goats and Sharma *et al.*, (2001) during detomidine sedation in yak.

Table 1: Effects of Anaesthetic Treatments on Haemoglobin, PCV, TEC and TLC at Different Time Intervals in Yaks

Parameter	Haemoglobin (G/Dl)		Sig	PCV (%)		Sig	TEC (G/Dl)		Sig	TLC (G/Dl)		Sig
Group	AK	MK		AK	MK		AK	MK		AK	MK	
0 min Mean± SE	11.73 ±0.55	11.12 ±0.37	NS	34.33 ±2.83	32.75 ±2.58	NS	5.28 ±0.36	5.05 ±0.41	NS	4.51 ±0.32	4.41 ±0.69	NS
15 min Mean ± SE	10.68 ±0.31	10.93 ±0.45	NS	33.16 ±3.15	30.00 ±1.20	NS	4.92 ±0.20	4.88 ±0.38	NS	4.10 ±0.16	4.30 ±0.58	NS
30 min Mean ± SE	10.52 ±0.51	11.10 ±0.51	NS	29.83 ±1.75	31.08 ±1.52	NS	4.83 ±0.35	4.98 ±0.38	NS	4.28 ±0.16	4.43 ±0.49	NS
60 min Mean ± SE	11.22 ±0.47	11.29 ±0.69	NS	32.16 ±3.63	31.25 ±1.28	NS	5.18 ±0.25	5.38 ±0.36	NS	4.33 ±0.11	4.52 ±0.45	NS
90 min Mean ± SE	11.34 ±0.52	11.16 ±0.75	NS	33.83 ±4.05	32.41 ±0.85	NS	5.51 ±0.46	5.16 ±0.40	NS	4.48 ±0.30	4.45 ±0.56	NS
Significance	NS	NS	-	NS	NS	-	NS	NS	-	NS	NS	-

Values in the same row and column with similar superscripts do not differ significantly, *P<0.05

NS= non-significant

CONCLUSIONS

The haematological parameters from the present study showed haemoglobin, packed cell volume, total erythrocyte count and total leukocyte count values falls within the normal values of yaks. Therefore, acepromazine and midazolam were found to be safe and could be recommended during anaesthetical use in yak.

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